



Defense Energy Support Center

**Product  
Technology  
&  
Standardization  
Division**

**Defense Energy Support Center**

**Alternative Fuels Information Station**

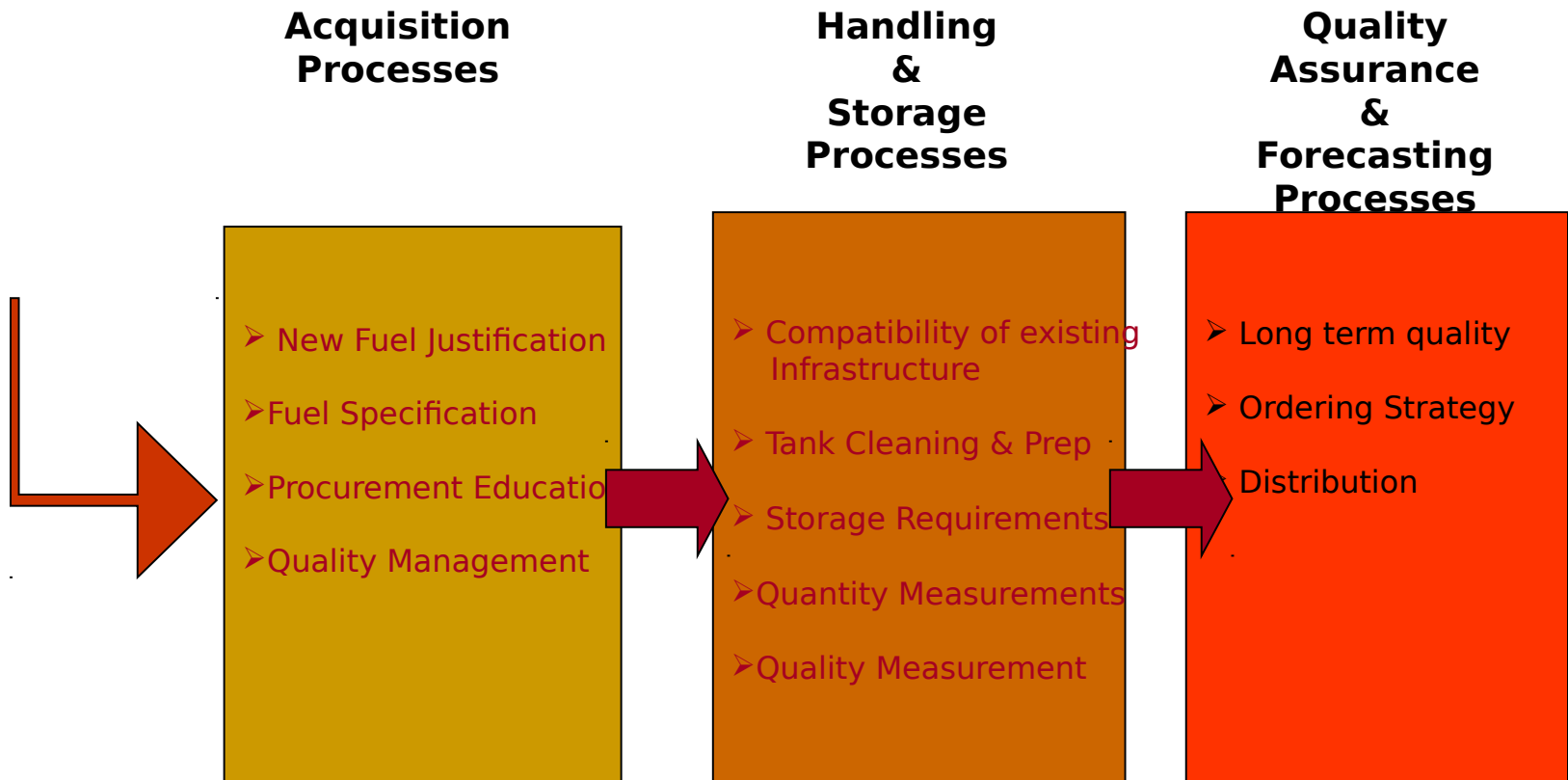
# Alternative Fuel Logistics Tutorial



# Learning Objectives

*You should learn....*

## DESC Fuel Introduction Process (Fuel Logistics)



# DESC Fuel Introduction Process (Fuel Logistics)

## Acquisition Processes

- New Fuel Justification
- Fuel Specification
- Procurement Education
- Quality Management

## Handling & Storage Processes

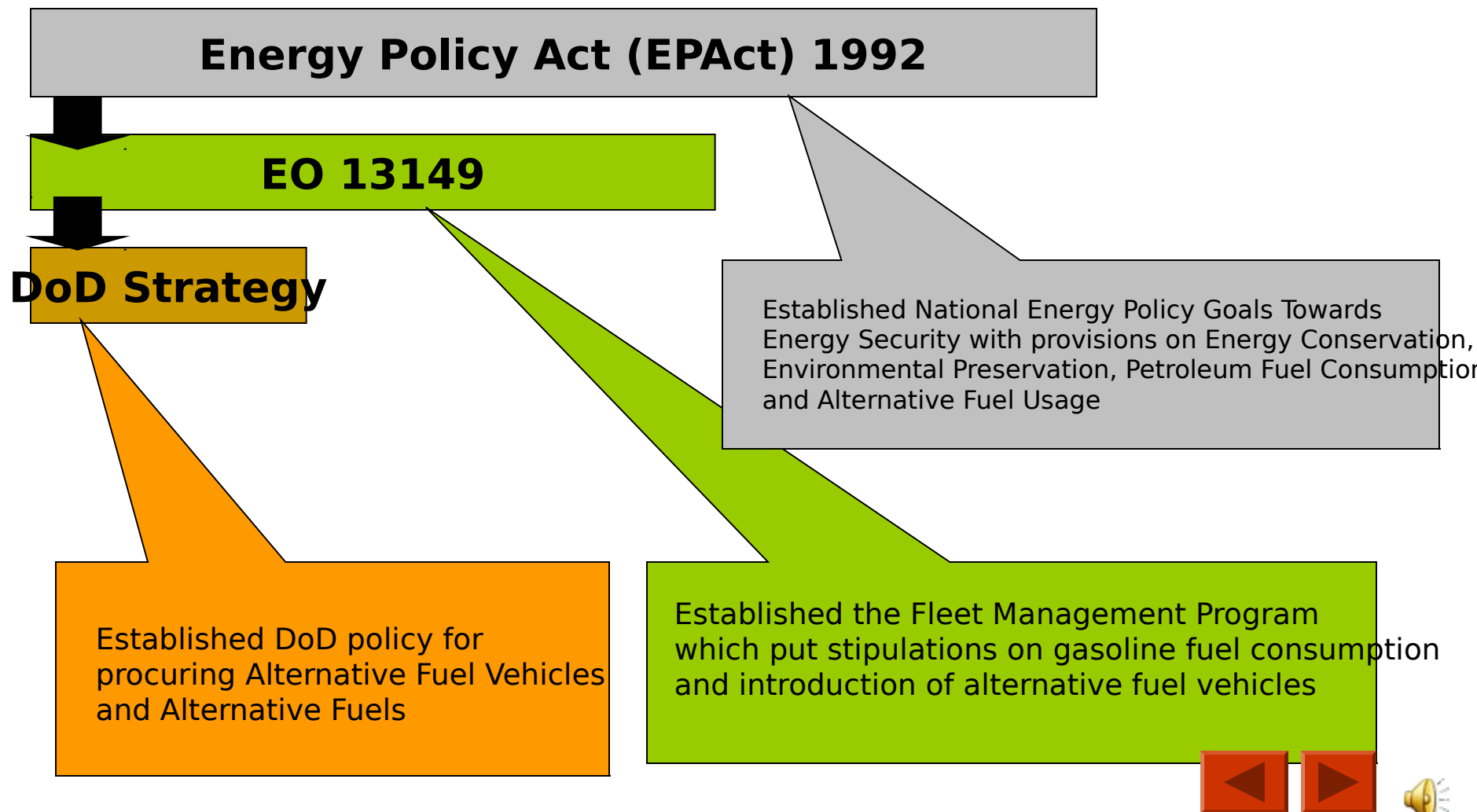
- Compatibility of existing Infrastructure
- Tank Cleaning & Prep
- Storage Requirements
- Quantity Measurements
- Quality Measurement

## Quality Assurance & Forecasting Processes

- Long term quality
- Ordering Strategy
- Distribution



# Justification of New Fuels



# What are the new fuels?

## Biodiesel Fuel (B100)



Mono alkyl esters of long chain fatty  
Acids made from vegetable oils and  
animal fats



B20- 80% Diesel Fuel+ 20%  
Biodiesel



Commerical Item Description A-A-59693 A

## Fuel Ethanol



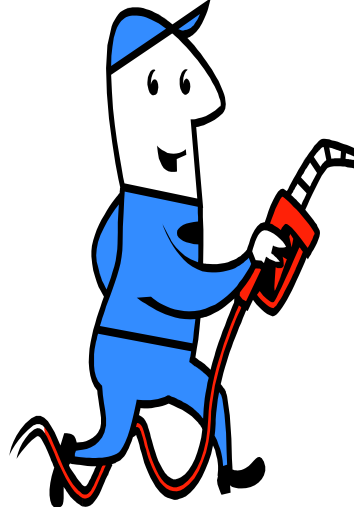
Made from grain/feedstock products



E85- 85% Fuel Ethanol+15% Gasoline



Fuel Ethanol (Ed75-Ed85) ASTM-5798



# How Do I Acquire Alternative Fuels from DESC?

DESC buys fuel and energy products for both Military and Federal Civilian Agencies



Military groups submit Requirements to Service Energy Offices



Federal agencies submit requirements directly to DESC



# What Should The Requirements Document Include

At A Minimum:



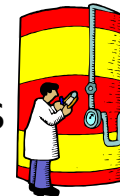
Location

Current Point of Contact



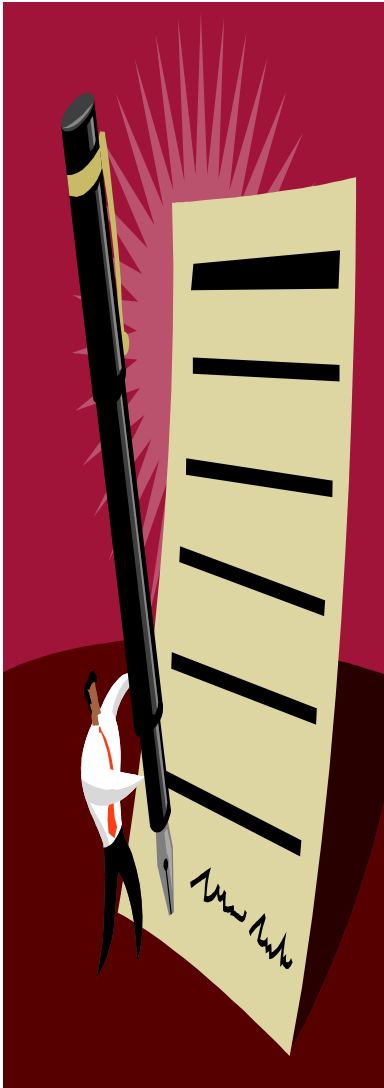
Projected Annual Usage (Gallons)

Number of Tanks & Sizes



Preferred Method of Delivery

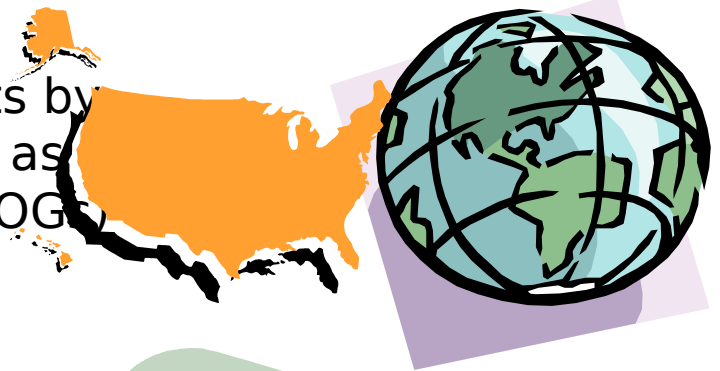
Frequency of Deliveries



# How Does DESC Purchase Alternative Fuels? (e.g. B20, E85)



DESC consolidates requirements by Geographic regions designated as Customer Organized Groups (COGs)



Prepares solicitation packages and Advertises to potential suppliers



Suppliers bid on the entire region or specific line items





# Ground Fuels Division (DESC-PE/PL)

Commerical Phone  
(703) 767-XXXX

DSN  
427-XXXX



<p><b>COGs 2,3 and 3 - Ground Fuels Division I,</b></p>	<p><b>COGs 6, 7, 8, AK, HI and PR - Ground Fuels Division II,</b></p>
<p><b>George Atwood, Division Chief</b></p>	<p><b>Juli Manley, Division Chief</b></p>



# Solicitation Package Contents

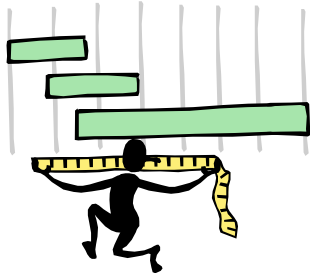
*Informs potential suppliers of the terms and conditions for bidding including.....*



Fuel Specifications



Quality Assurance Provisions



Quantity Measurements



Delivery Requirements



Points of Contact



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# Biodiesel Properties

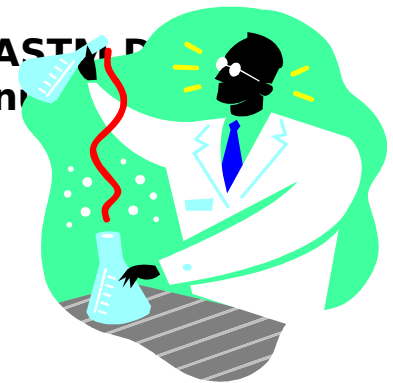
**Per Specification Clause C16.27 B20 Biodiesel (DESC Oct 2003)**

## PRODUCT COMPOSITIONAL REQUIREMENTS

1. **20% +/- 1% mono-alkyl esters of long chain fatty acids derived from virgin vegetable oil blend stock and/or yellow grease blend stock per ASTM D 6751.**
2. **80% minimum low sulfur diesel fuel oil conforming to ASTM D 975, grade low sulfur number 1-D or grade low sulfur number 2-D.**

## PRODUCT PERFORMANCE REQUIREMENTS

1. **Appearance per ASTM D 4176 - Clear & Bright**
2. **Cloud Point Per ASTM D 2500(test) and ASTM D 975 (characteristics)**



# Biodiesel Properties

## Per Specification Clause C16.27 B20 Biodiesel (DESC Oct 2003)

### PRODUCT LOW TEMPERATURE PERFORMANCE



1. Lower temperature defined by 1 of the 2 properties: Cloud Pt, Cold Filter Plugging Point (CFPP)
2. Cloud Point tested per ASTM D 2500  $< \text{or} = 10^{\text{th}}$  percentile minimum ambient temperature in the geographical area and seasonal timeframe in which the B20 is to be used, when tested per ASTM D 975

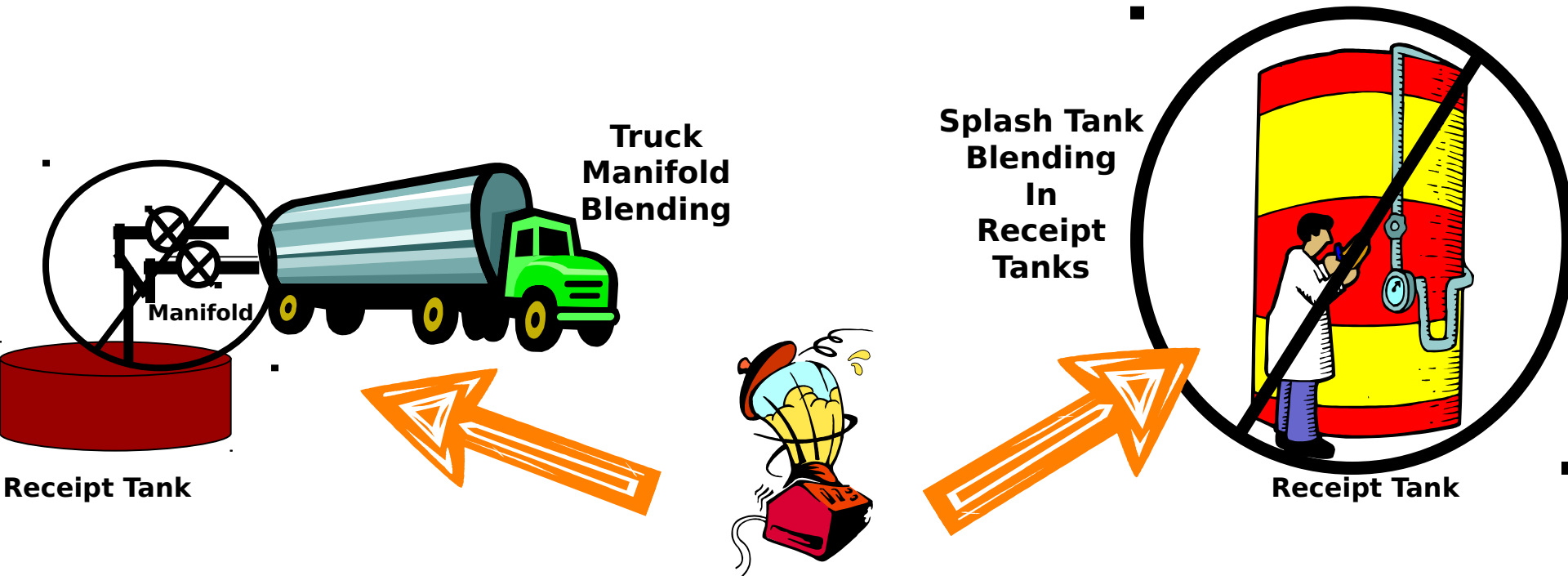


3. Max CFPP of the B20 shall be a minimum of 10 degrees Celsius below  $10^{\text{th}}$  percentile minimum ambient temperature in the geographical area and seasonal timeframe in which the B20 is to be used, when tested per ASTM D 6371



# Biodiesel Quality Assurance

Techniques NOT permitted by DoD Specification

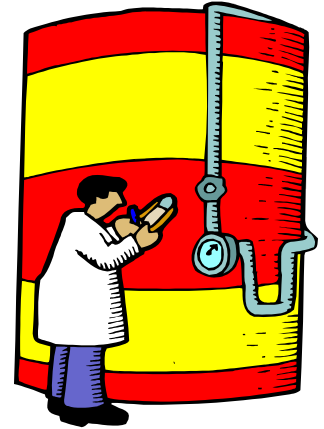


**NOTE: AFTER FIRST SHIPMENT OF BIODIESEL, FILTERS SHOULD BE CHECKED AND MAY NEED TO BE CHANGED DUE TO THE CLEANING CAPABILITIES OF THE BIODIESEL PRODUCT.**



# Biodiesel Fuel Management

## Fuel Tank Cleaning Requirements



### USE EXISTING DIESEL TANKS

- (1) **DETERMINE AMOUNT OF WATER IN THE TANK WITH WATER FINDING PASTE.**
- (2) **LOOK AT WATER FINDING PASTE FOR ANY CLUMPS OF SLUDGE OR SEDIMENT AND FROM THIS, ESTIMATE LEVEL OF SLUDGE OR SEDIMENT IN THE BOTTOM OF THE TANK.**
- (3) **IF TANK DOES NOT CONTAIN MORE THAN 1/4 INCH OF WATER AND LESS THAN 1/2 INCH OF TOTAL WATER, SLUDGE AND SEDIMENT, THEN DRAW THE TANK DOWN AS LOW AS POSSIBLE AND REFILL WITH BIODIESEL.**
- (4) **IF WATER/SLUDGE/SEDIMENT LAYER IS GREATER THAN 1/2 INCH, ATTEMPT TO DRAIN AS MUCH AS POSSIBLE. IF IT CAN BE DRAINED TO THE REQUIREMENTS IN 3 ABOVE, THEN DO SO. THEN DRAW THE TANK DOWN AS LOW AS POSSIBLE AND REFILL WITH BIODIESEL.**
- (5) **IF DRAINING CANNOT BE ACCOMPLISHED, THEN THE TANK SHOULD BE CLEANED BEFORE PUTTING BIODIESEL IN THE TANK.**



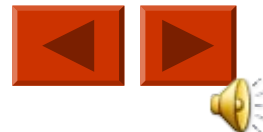
# E85 Specifications

## ASTM D5798-99 Standard Specification for Fuel Ethanol (Ed75Ed85) For Automotive Spark-Ignition Engines

Property	Value for Class			Test Method
ASTM volatility class	1	2	3	N/A
Ethanol, plus higher alcohols (minimum volume %)	79	74	70	ASTM D5501
Hydrocarbons (Including denaturant) (volume %)	17-21	17-26	17-30	ASTM D4815
Vapor pressure at 37.8°C				
kPa	38-59	48-65	66-83	ASTM D4953, D5190, D5191
psi	5.5-8.5	7.0-9.5	9.5-12.0	
Lead (maximum, mg/L)	2.6	2.6	3.9	ASTM D5059
Phosphorus (maximum, mg/L)	0.3	0.3	0.4	ASTM D3231
Sulfur (maximum, mg/kg)	210	260	300	ASTM D3120, D1266, D2622
Methanol (maximum, volume %)		0.5	N/A	
Higher aliphatic alcohols, C3-C8 (maximum volume %)		2		N/A
Water (maximum, mass %)		1.0		ASTM E203
Acidity as acetic acid (maximum, mg/kg)		50		ASTM D1613
Inorganic chloride (maximum, mg/kg)		1		ASTM D512, D7988
Total chlorine as chlorides (maximum, mg/kg)		2		ASTM D4929
Gum, unwashed (Maximum, mg/100 mL)		20		ASTM D381
Gum, solvent-washed (maximum, mg/100 mL)		5.0		ASTM D381
Copper (maximum, mg/100 mL)		0.07		ASTM D1688
Appearance	Product shall be visibly free of suspended or precipitated contaminants (shall be clear and bright).			Appearance determined at ambient temperature or 21°C (70°F), whichever is higher.

N/A = Not applicable

Source: DOE: Handbook for Handling, Storing, and Dispensing E85



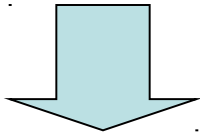


# E85 Fuel Management

*In many cases, existing, gasoline, diesel, or other hydrocarbon fueling systems are suitable to store and dispense E85*

## Use of Existing Fueling Systems

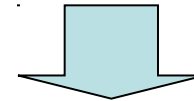
Many metal and fiberglass tanks which meet EPA codes, Dec. 98 are compatible with E85



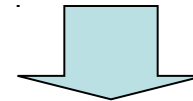
Fiberglass tanks manufactured before 1992 **MAY NOT** be able to store E85

## Preparing Existing Fueling Systems

**DO NOT** use plated steel tanks!!!



Tank cleaning is required to remove gasoline particulates.



The cleaning technique chosen will depend on the previous fuel stored and the condition of the tank

***Contaminated fuel is the most common source of operational problems with E85!!!***

Source: Handbook for Handling, Storing, and Dispensing E85



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# How does the government determine the quantity of a fuel delivery?

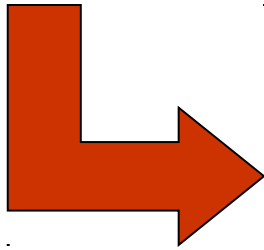
## Government Determination

DESC ground fuel customers receive fuels by 3 transportation modes:

Transport Truck with meter

Truck & Trailer with meter

Tank Wagon (equipped with meter by default)



Receiving government entity determines fuel quantity

1. Meter measurement
- OR**
2. Weight (using calibrated scales)
- OR**
3. Calibrated meter on receiving tank system



Note: Quantity measurement and delivery conditions are defined in F1.01-1 ***“Delivery Conditions for Transport Trucks and Trailers, and Tank Wagons”*** in DESC Ground Fuel Contracts.



# How does the government determine the quantity of a fuel delivery?

## Contractor Determination

Contractor may determine fuel quantity by:

1. Calibrated meter on the delivery conveyance
- OR**
2. Gauging the delivery conveyance
- OR**
3. Certified receiving tank markers
- OR**
4. Load rack meter or calibrated scales



Note: Quantity measurement and delivery conditions are defined in F1.01-1 ***“Delivery Conditions for Transport Trucks and Trailers, and Tank Wagons”*** in DESC Ground Fuel Contracts.



# Quality Assurance Requirements

## Contractor Quality Activities



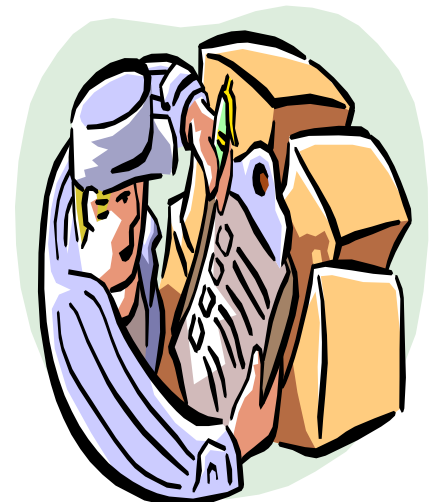
Alternative Fuels are supplied under Posts, Camps and Stations (PC&S) FOB Destination Contracts



Quality Assurance criteria and responsibilities are defined in E Clauses of the contract



Contractors are responsible for having a Quality System and product Quality assurance including maintaining records, sampling and testing of product



# Quality Assurance Requirements

## Government Quality Activities



Government Inspection and Acceptance are usually by receiving activities at destination



Receiving locations should report delivery and quality problems to contracting officer and quality problems to DESC-BQ



Contractor may be required to submit samples to government laboratory



Government reserves right to perform quality inspections at all times



Alternative fuels are commercial products and there is no government inspection at the vendor facilities



# Handling & Storage Strategy

## Gasoline/ Ethanol Fuel (E85)

Standard gasoline is refined or blended to be consumed with minimum storage time.

Gasoline intended for extended storage requires additives which improve storage quality



E85 is handled and stored in a manner consistent with Gasoline; however, Fuel operating equipment and materials should be evaluated for compatibility.

## Diesel/ Biodiesel (B20)

Standard diesel fuel is also refined to be consumed With minimum storage time.

Standard diesel fuel is blended with additives to improve cold temperature storage.



Biodiesel fuel storage requirements are similar to those of standard diesel.

Additives are available which can assist with storage and cold temperature handling



# Summary

*You should now know and understand....*



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